Homework 8

Submit your solution to Web-cat.

This homework is designed to give you some practice writing concurrent programs. This pdf presentation outlines the expected behavior. You are tasked with adding locks in the appropriate places, to get the system to behave as expected. When it works it will be music to your ears.

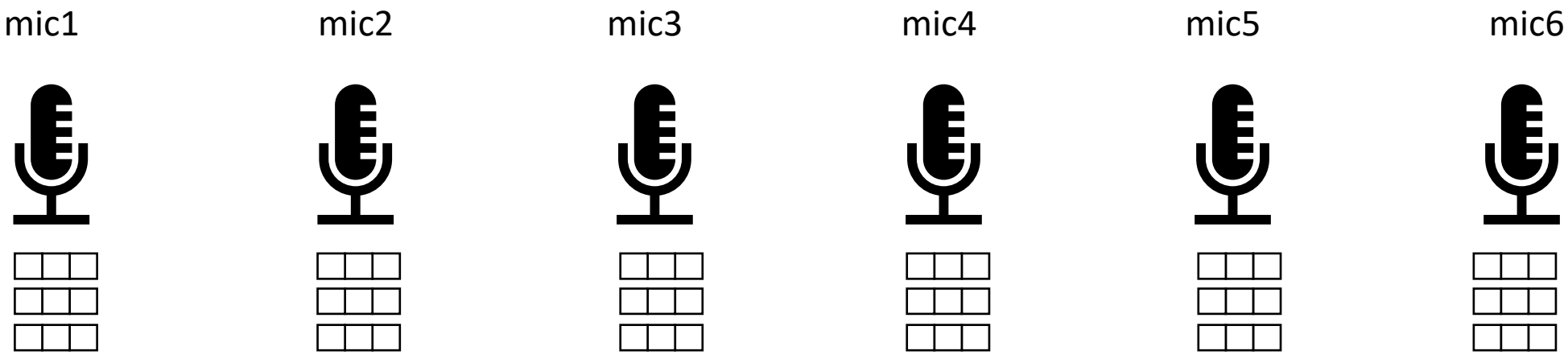
Setting up your eclipse environment:

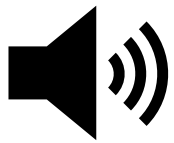
Download the zip folder that was attached to this homework assignment. It should contain 3 java files. Create a new project called ThreadingFun and copy all 3 files into it.

1. AudioConcentrator.java
2. Microphone.java
3. Player.java

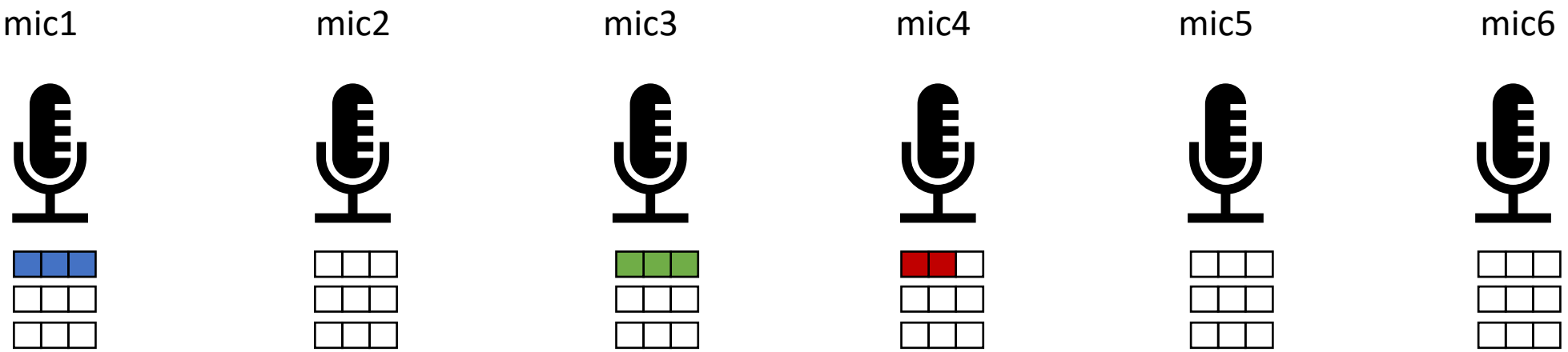
Overview

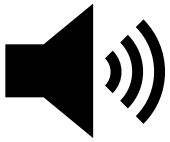
The application has 6 virtual microphones. Each microphone records a different tone. Each tone recording is stored in its own array.



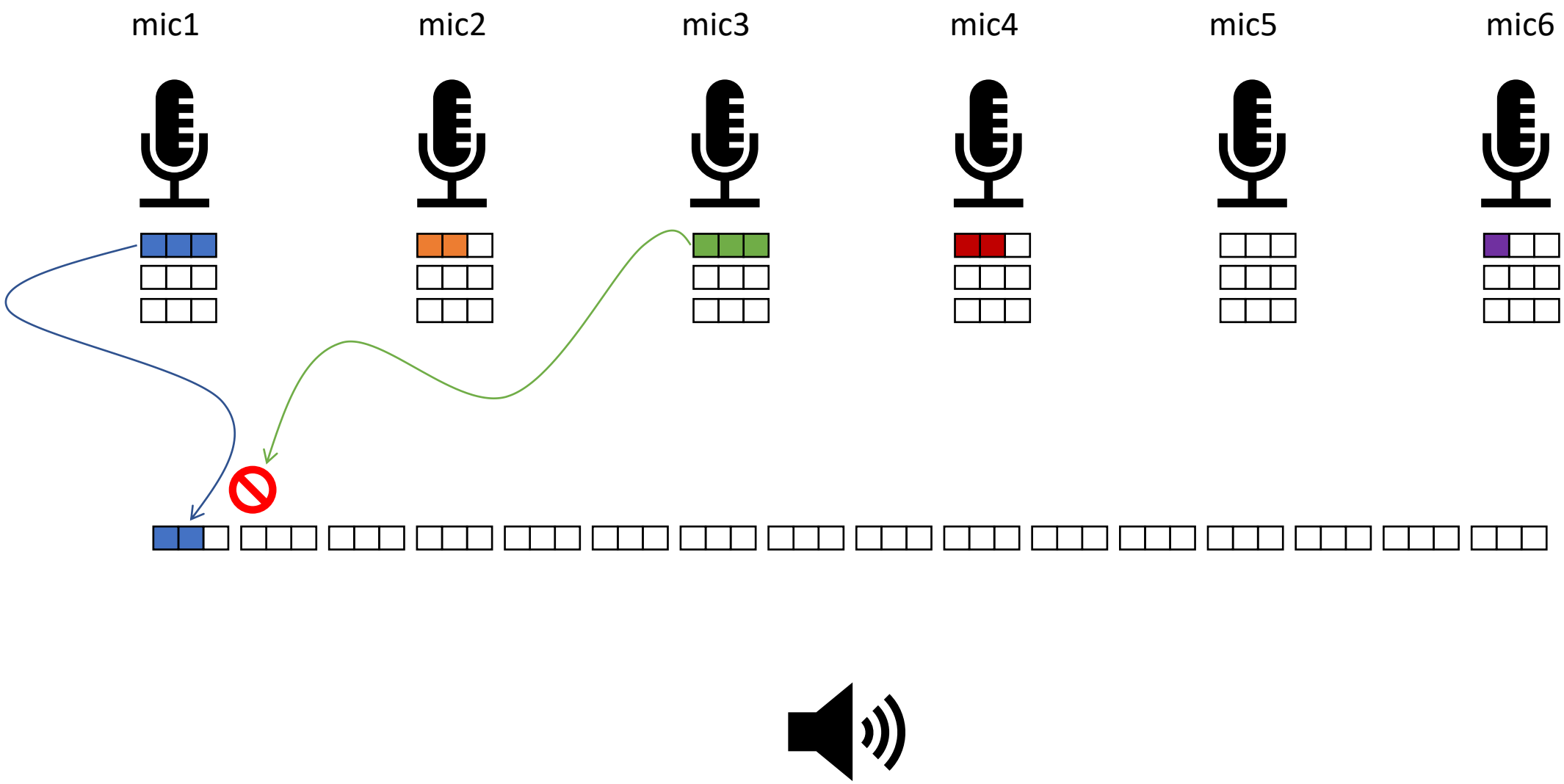


Step 1: Microphones can record tones simultaneously. And will record a maximum of 3 tones.

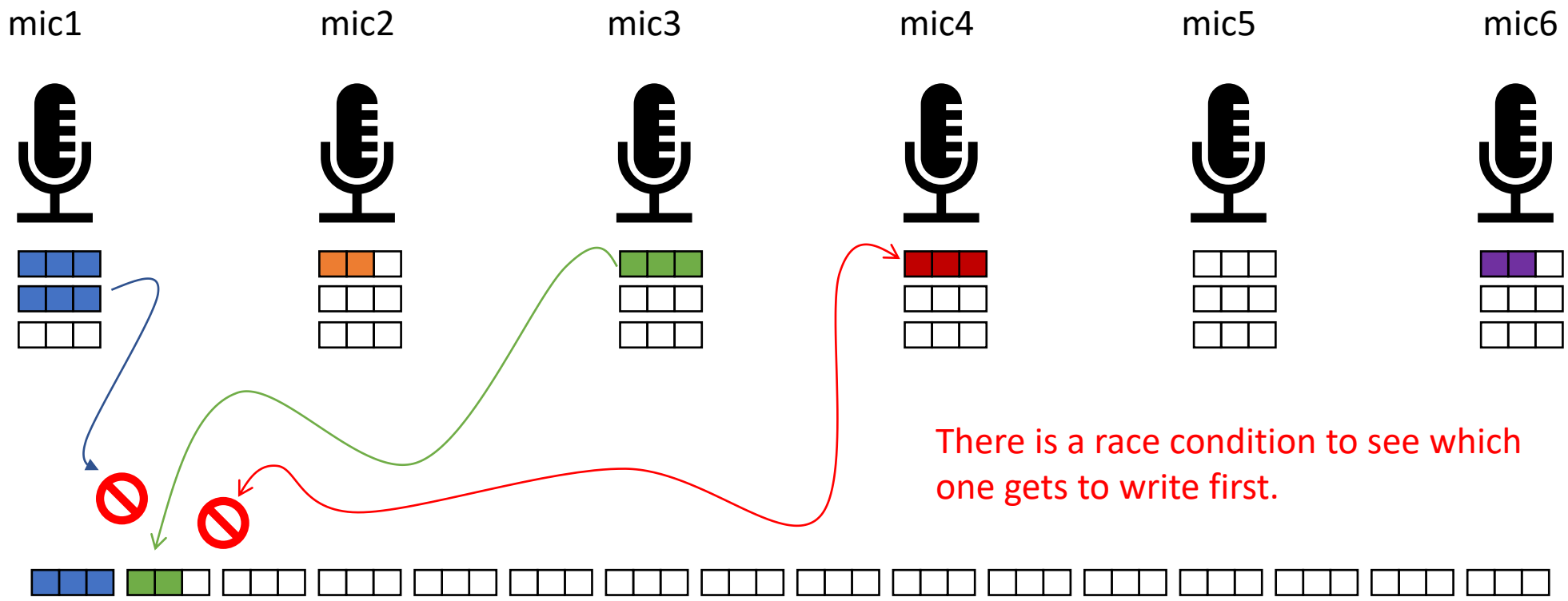


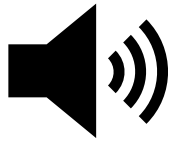


Step 2: Once a microphone has recorded a complete tone, it will attempt to upload its data to the global array. However, only 1 microphone can write to the global array at a time.

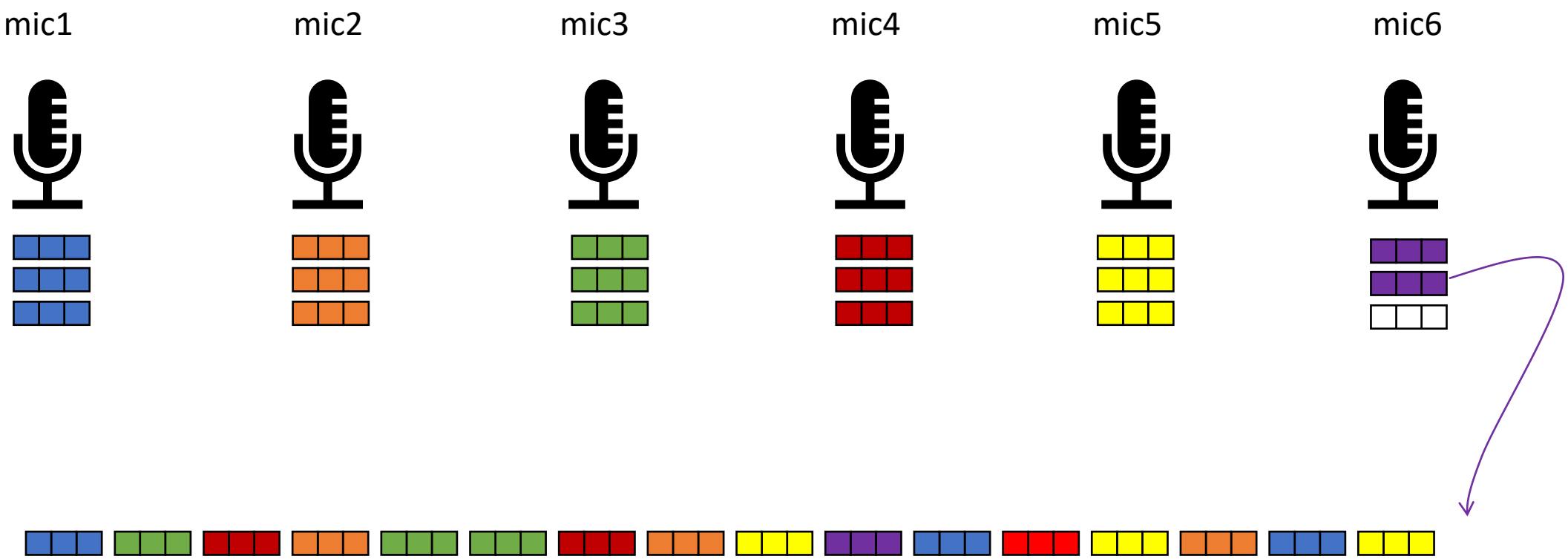


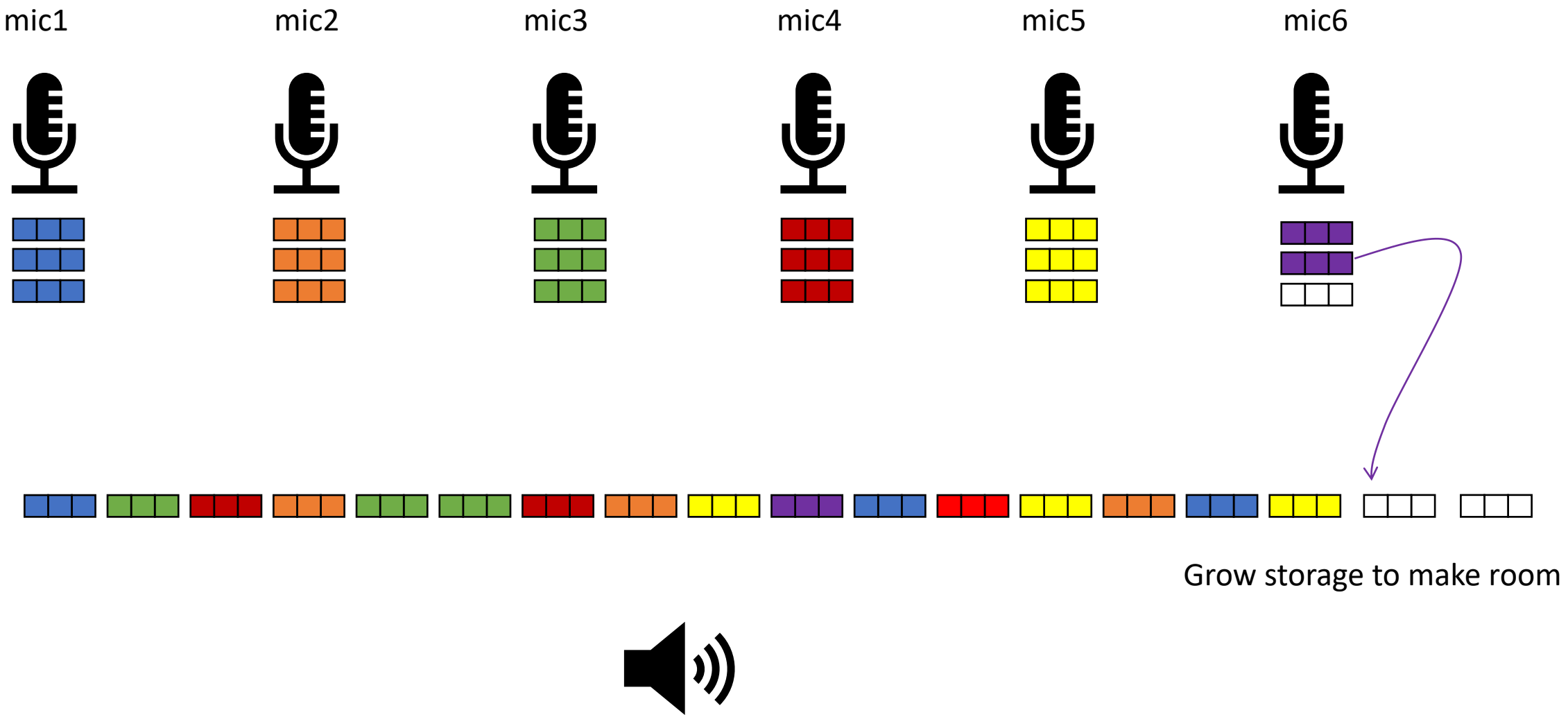
Step 3: Once a microphone has written to the array another may attempt to access the array. The thread scheduler picks the next microphone. It isn't always the next in line.



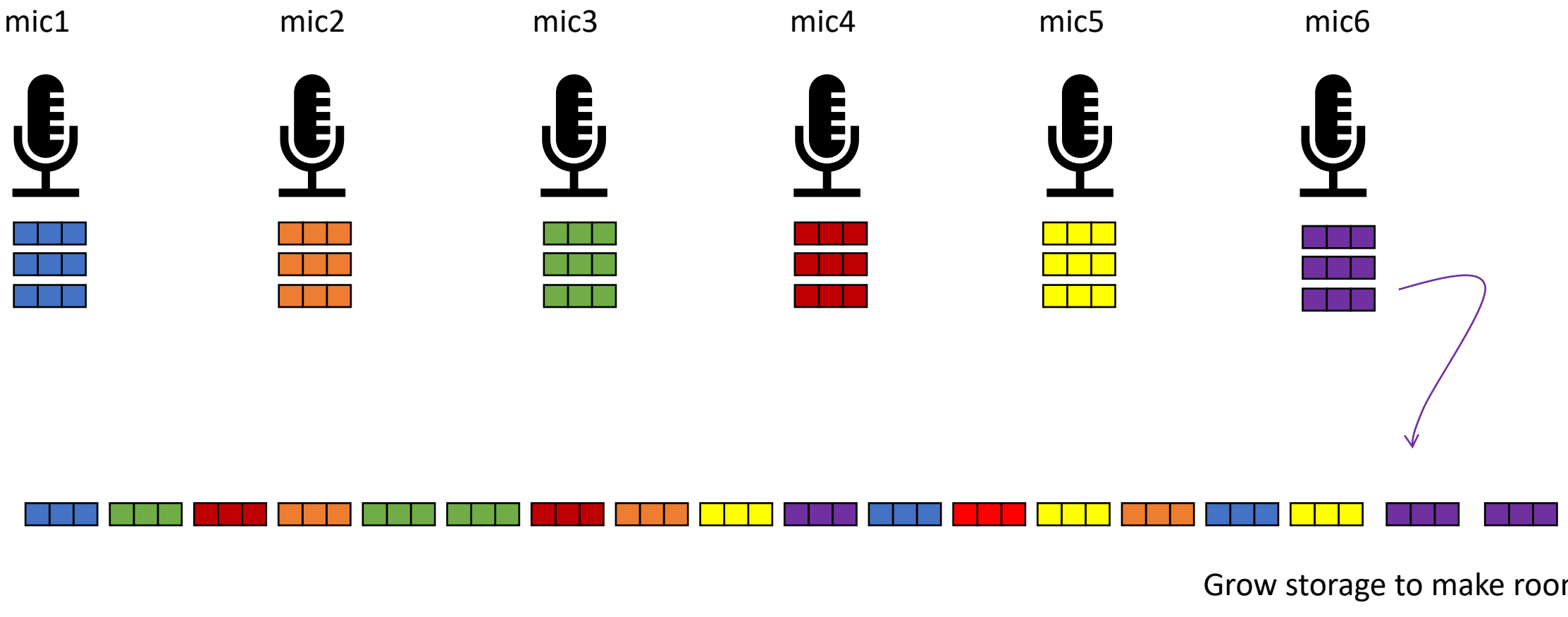


Step 4: If the array is full the program grows the global array to make room for additional samples

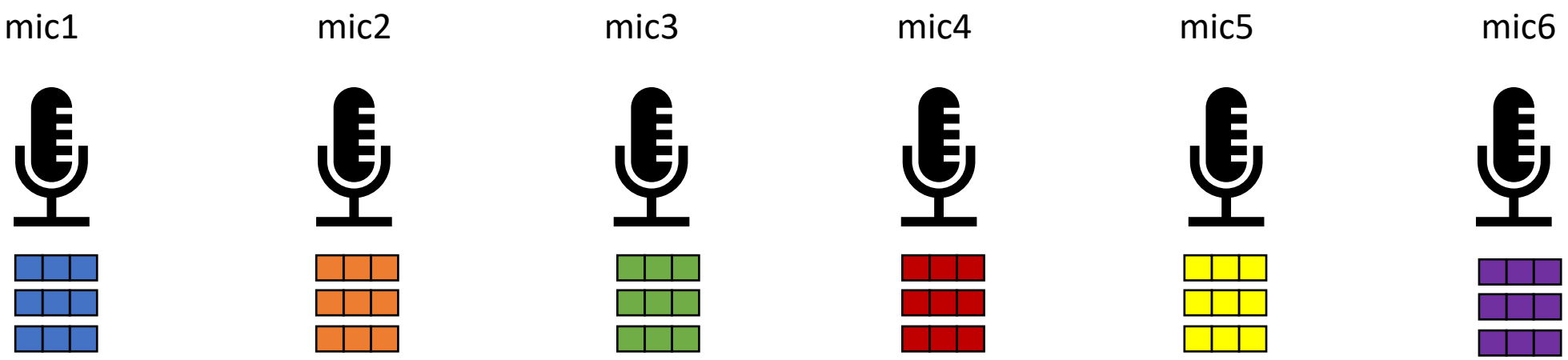



mic1
mic2
mic3
mic4
mic5
mic6
Grow storage to make room

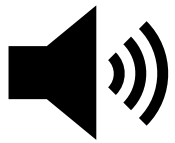
Step 5: Once the global array has been resized the microphone can write to it.



Step 6: Once there are no longer any active microphones. The array is passed to the player.



Once active mic count is zero:
Play sound buffer



Key Conditions

- 1 All mics can listen for tones simultaneously.
- 2 Only one mic can write to the data store at a time
- 3 You can only play the buffer when all mics have saved their records to the buffer. (i.e. no active mics)

- **Shared resources:**
  - Number of Active Mics
  - Data Buffer that is played.

Task

- Add the appropriate
  - try/catch/finally blocks,
  - locks and unlocks, and
  - conditions (await()/signalAll())

  as needed to the specified methods in AudioConcentrator.java file

- Submit your solution to Web-CAT.